CLAIMS

1. A method of producing aerobic biogranules for the treatment of waste water comprising the steps of:

a) introducing waste water into a reactor containing an active biomass sludge;

b) supplying an oxygen-containing gas to the reactor to provide a mixing action and transfer of dissolved oxygen into the sludge in the waste water, the supply of oxygen containing gas providing a superficial upflow gas velocity above 0.25 cm/s;

c) initiating a period of nutrient starvation in the reactor while continuing to supply oxygen-containing gas;

d) allowing formed aerobic granules to settle;

e) discharging and replacing at least a portion of the waste water;

f) repeating steps (a), (b), (c), (d) and (e) until the granules have predetermined physical properties; and

g) recovering biomass granules within those predetermined properties.

2. The method of claim 1 wherein the starvation period in the reactor is at least 75% of the reaction cycle.

3. The method of claim 1 wherein the steps (b) to (d) are the equivalent of a single reaction cycle, the reaction cycle being repeated a plurality of times to produce biogranules of the predetermined size.

4. The method of claim 1 wherein the flow of oxygen-containing gas into said reactor creates turbulent flow within the reactor.

5. The method of claim 1 wherein the superficial upflow gas velocity is above 0.3 cm/s and less than 3.6 cm/s.

6. The method of producing aerobic biogranules for the treatment of waste water comprising the steps of:

a) introducing waste water into a reactor;

b) seeding the reactor with an active biomass material;

c) supplying oxygen containing gas to the reactor to provide a mixing action and oxygen to the suspension of biomass material in said waste water, the supply of oxygen-containing gas providing a superficial upflow gas velocity greater than 0.25 cm/s;

d) initiating a period of nutrient starvation of the biomass material while continuing to supply oxygen containing gas;

e) allowing formed aerobic granules to settle in a settling zone in said reactor;

f) discharging at least a portion of the waste water;

g) repeating steps (a) to (f) until at least a portion of the biogranules in said settling zone are within predetermined properties; and

h) recovering said biomass granules with those predetermined properties.

7. The method of claim 6, wherein the superficial upflow gas velocity is greater than 0.3 cm/s and less than 3.6 cm/s.

8. The method of claim 6 wherein steps (c) and (d) are the aeration stage of a single reaction cycle, the starvation period lasting at least 75% of the aeration stage.

9. The method of claim 6 wherein the predetermined physical property is a roundness aspect of 0.0 to 3.0.

10. The method of claim 6 wherein the predetermined physical property is a density of between 1.004 to 1.85 g/cm^3.

11. The method of claim 6 wherein the predetermined physical property is an average particle size of between 100 and 10,000 µm.

12. The method of claim 6 wherein the distance from any part of the formed biogranule to the nearest surface is less than 800 µm.

13. The method of claim 6 wherein the maximum diameter is 1600 µm.

14. The method of claim 6 wherein the settling zone is non-aerated.

15. The method of claim 6 wherein the ratio between the biomass of selected biogranules and suspended smaller particles of the biomass is between 0.001 to 0.20.